



Title: Computer graphics

Final exam, Date: 3/6/2012, Total marks: 75

Course code: CCE2211

Allowed time: 3 hours

Year: Second year

Number of pages: 2

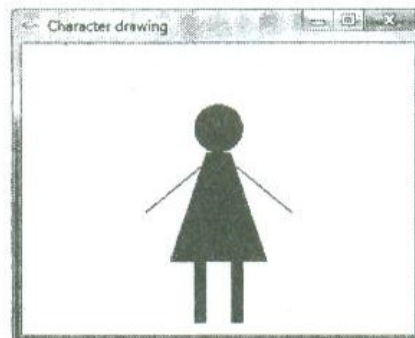
Workout the following questions

Question 1 (15 marks)

- Mention some application areas of computer graphics. (5 marks)
- Explain why images are better displayed than text on CRT monitors while text is better displayed than images on LCD monitors. (5 marks)
- Movies are generally produced on 35-mm film that has a resolution of approximately 2000 x 3000 pixels. What implication does this resolution have for producing animated images for a video show on a computer as compared with film? (5 marks)

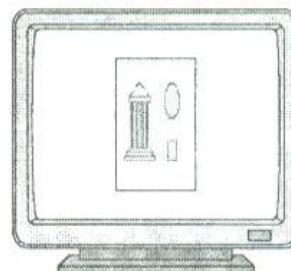
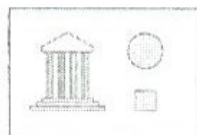
Question 2 (15 marks)

- Explain with examples when possible: "OpenGL graphics library functions can be generally classified into primitive functions, attribute functions, viewing functions, transformation functions, input functions, control functions and query functions." (5 marks)
- Write an OpenGL program to draw the symbolic characters shown below. (10 marks)



Question 3 (15 marks)

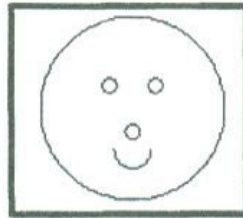
- The following figure shows a scene that appears deformed when displayed on the output screen of an OpenGL program
 - Discuss possible reasons that could lead to the shown deformation
 - How you can avoid such deformations?



- b) What is the purpose of each of the following OpenGL function calls? Explain how the parameters are used, if any. (10 marks)
- `glClear(GL_COLOR_BUFFER_BIT);`
 - `glutInitDisplayMode(GLUT_SINGLE | GLUT_RGB | GLUT_DEPTH);`
 - `glEnable(GL_DEPTH_TEST);`
 - `glOrtho(-50.0, 50.0, -50.0, 50.0, -50.0, 50.0);`

Question 4 (15 marks)

- a) What is the difference between interactive and non-interactive computer graphics program? What are the components/libraries required to implement an OpenGL interactive computer program? (5 marks)
- b) Write an OpenGL program that draw a face. Model the face simply by one circle for the outline, two circles for the two eyes, one circle for the nose, and one half-circle for the mouse (see the figure below). Your program should use hierarchical modeling implemented by display lists to draw the face.. (10 marks)



Question 5 (15 marks)

- a) Mention some possible reasons that could lead to flickering or to the appearance of artifacts when executing an OpenGL program (5 marks)
- b) If you know the following:
The two-dimensional point (in a Cartesian coordinates): $x = \cos(\theta)$, $y = \sin(\theta)$ lies on a unit circle regardless of the value of θ . Also, the three points $(-\sin(\theta), \cos(\theta))$, $(-\cos(\theta), -\sin(\theta))$, and $(\sin(\theta), -\cos(\theta))$ lie on the unit circle. These four points are equidistant along the circumference of the circle. By connecting the four points we get a square that has a side length of $\sqrt{2}$. This is true for any value of θ .
Write an OpenGL program that draw a rotating square using the above information

Good Luck

Course Coordinator: Dr. Hamed Hemeda

And the examination committee